

# Cloud-edge collaboration for manufacturing automation

## (Code: 3w14e)

### **Goal:**

Cloud computing is a new computing paradigm, which is able to provide various types of services for manufacturing businesses. However, albeit with strong resource service capability, traditional cloud computing cannot satisfy time-sensitive manufacturing applications because of the long-distance transmission incurred large delay. Furthermore, uploading all data to the cloud data center will also put a lot of pressure on network bandwidth. In order to overcome the shortcomings of cloud computing, another new computing paradigm – edge computing – which performs computations at the edge of the network emerges. Due to the fact that edge computing nodes are closer to industrial equipment, it is able to reduce data transmission delay and network bandwidth, enhance security, and protect privacy. However, edge computing nodes have limited resources compared to cloud computing. As a consequence, cloud-edge collaboration that combines the advantages of cloud computing and edge computing becomes a new research trend. Cloud and edge can collaborate with each other in terms of resources, data, intelligence, business orchestration, application management, and services. During the past decade, intelligent manufacturing concepts such as Industrial Internet, Industry 4.0, and cloud manufacturing that take cloud computing as one of the underpinning technologies have been proposed. Cloud-edge collaboration provides promising solutions to various intelligent manufacturing automation applications in the above-mentioned areas of collaboration such as computing resource management, real-time equipment monitoring and control, diagnostic and predictive maintenance, and intelligent scheduling.

### **Topics:**

This special session aims to provide a forum for academic researchers and industrial practitioners to report their latest advances on cloud-edge collaborative manufacturing automation. Topics include, but are not limited to:

- Architecture and framework of cloud-edge collaborative manufacturing automation
- Cloud-edge collaborative computing resource management for manufacturing automation
- Cloud-edge collaborative data processing and analysis manufacturing automation
- Cloud-edge collaborative model training and inference manufacturing automation
- Algorithms and approaches for cloud-edge collaborative manufacturing automation applications, such as real-time equipment monitoring and control, diagnostic and predictive maintenance, and intelligent scheduling
- Modeling and simulation on cloud-edge collaborative manufacturing automation
- Cloud-edge collaborative manufacturing automation systems
- New technologies that enhance cloud-edge collaborative manufacturing automation such as IoT, 5G, digital twin, etc.

### **Contact the lead organizer:**

Yongkui Liu, Associate Professor  
School of Mechano-Electronic Engineering  
Xidian University  
E-mail: yongkuiliu@163.com